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[COLLECTANEA ADAMANTÆA.—XV.]

Un-Natural History,

OR

MYTHS

OF

ANCIENT SCIENCE;

Being a Collection of Curious Tracts on the Basilisk, Unicorn, Phœnix, Behemoth or Leviathan, Dragon, Giant Spider, Tarantula, Chameleons, Satyrs, Homines Caudati, &c.

NOW FIRST TRANSLATED FROM THE LATIN,

AND

Edited, with Notes and Illustrations,

BY

EDMUND GOLDSMID, F.R.H.S.,
F.S.A. (Scot.)

IN FOUR VOLUMES.

VOL. III.

PRIVATELY PRINTED.
EDINBURGH.
1886.

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[COLLECTANEA ADAMANTÆA.]

Myths of Ancient Science.

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The Leviathan.

CHAPTER I.

ARGUMENT.

1. A quotation.
2. The Crocodile not really meant here, nor the Serpent, nor any of the monstrosities of the Rabbis.
3. By the Leviathan is meant the Whale.
4. Incredible size of the Whale. A collection of instances.
5. The huge rib of one preserved in the Church of Wittemberg.
6. The extremely dangerous character of the capture of the Whale.
7. The same continued. The Indian method of capture.
8. The sinking of ships by the Whale. Its pranks in the sea.
9. Conclusion.

I. We have now to pass from the largest of land animals to the largest of those that live in the water. The name of this beast is the Leviathan. The Hebrew root of this word is "Lavah" which means, assumption, accretion, accumulation, increase. Hence Leviathan, whose size is remarkable. (Franzius, *Animal Histor.*, p. 604). The Latins call it the Cetus.

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There are very many kinds of the Cetus. The chief is the common whale, next to which come the Orca, the Physter, the Dolphin, the Scolopender, and the Sea-cow. We are quite assured that in the present instance reference is made to the common whale because of the attributes claimed for it. The words of God in the 41st chapter of Job should be familiar to us: "Canst thou draw out the Leviathan with an hook? or his tongue with a cord which thou lettest down? Canst thou put an hook into his nose? or bore his jaw through with a thorn? Will he make many supplications unto thee? Will he speak soft words unto thee? Will he make a covenant with thee? Wilt thou take him for a servant for ever? wilt thou play with him as with a bird? or wilt thou bind him for thy maidens? shall thy companions make a banquet of him? shall they part him among the merchants? canst thou fill his skin with barbed irons? or his head with fish spears? Lay thine hand upon him. Remember the battle, do no more. Behold the hope of him is in vain! shall not one be cast down even at the very sight of him? None is so fierce that dare stir him up."

II. We cannot in the present place give any attention to Beza who understood by the Leviathan, a Crocodile or some kind of aquatic serpent. We must at the same time exclude certain per-

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vertors of the text who maintain that nothing but a serpent is here meant. The notion of R. Kimchus we must also dispense with, to whom the word Leviathan signifies some kind of very large serpent destructive to ships. I cannot listen for even a moment to Rabbi Manasseh Ben Israel, when he prates on the Resurrection of the Dead, (Bk. ii., chap. 19, p. 225), and says that by the Leviathan is meant that banquet which God shall prepare for those who have lived good and holy lives on this earth. Rabbi Moses Majemon has a similar fiction (in More Nebuchim, part iii., chap. 23, p. 404), where he says that under the Leviathan is included all the general properties of all bodies, which are dispersed among all the animals that fly swiftly, or walk. In the Talmud, the ridiculous idea of a fish three miles long has been introduced as the daily food of the Leviathan. (Compare Buxtorf. *In Synagog. Iud.*)

III. We, however, will dismiss these silly tales, and continue our argument. That only is properly meant by the Leviathan which, without any figure of speech, can claim all those qualities attributed it. We cannot, even if we wish, make the Leviathan larger by any efforts of our own. When put to the test, it is found to be less than supposed. We have first, however, to make some remarks on this vast and unconquerable sea-monster. Everything tends to the conclusion

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that the claims we make for it are right. No animal in any sea approaches in size, terribleness, and ferocity to the Whale. None surpass it. I shall prove this (1), From its great size, (2) from the extreme difficulty of its capture, (3) from its extreme ferocity, (4) from the impossibility of all intercourse between it and man, (5) from the extreme difficulty of killing it. These points can be proved from the description we have given of it above.

IV. That fish must surely be of vast size which could swallow the prophet Jonah with one gape of its jaws, and throw him up again after three days unharmed. There was a Whale taken in 1531 at Harlem, in Batavia, which was of the ordinary kind, 68 feet long. In 1577, not far from Antwerp, there was another taken in the river Sheldt 85 feet in length. The one which was captured in 1532, having been cast up on the shore by the waves, was of immense size. A part of it appeared out of the water, a part remained buried in the waves. Though greatly mangled and destroyed by the ravages of beasts and fishes, yet so much of it remained as to be beyond the capacity of one hundred huge waggons to remove. It was 30 cubits in length. The gape of its jaws embraced a space of 6½ cubits. Its jaws were 7½ cubits in length. It had 30 ribs, each of which was 21 feet long. The length of its head,

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from the base to the snout, was 8 cubits: its tongue was 7 cubits in length. But we must be brief. The reader may find several other particulars of this fish in *Letter to Polydore Virgil*, which can be seen in Franzius, part iii. (*Animal Hist.*, chap. 2.) The same writer has also the following account:—"In 1545, in Pomerania, at Gryphiswald, there was taken a small Whale, in which there was yet found an immense amount of fishes not yet digested, and among the rest a living salmon, three feet in length. These fishes filled three casks. Hieronymus Welschius (chap. v., on Italy, p. 33, which see) will be found to give an account of Whales of a size more remarkable than any yet seen.

V. While on this point, it may not be out of place to mention the very large rib of a whale which is preserved in the chapel at the Castle of Wittemberg. This rib is 14 feet long, and was deposited in its present place (where it is fastened to the wall by an iron chain) by the late Elector of Saxony, Frederick the Wise. It can be seen by visitors, and there is a label attached on which the following verses are inscribed, according to the spirit of that age:—

> Omnes interrigenæ prægrandem cernite cete,
> Bis septem pedum, costa de latere tensâ.
> Cunctipotentis opus, non perscrutabile cuivis,
> Perspicuis undis sub, talia monstra creavit.

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VI. Many accounts are given of the method of capturing the Whale. All these accounts are extremely diffuse, though this is a circumstance scarcely to be wondered at. Oppian, Albertus, Rondeletius, and Ulysses Aldrovandus, who took his materials from these writers, should all be consulted. (Icthyol., Bk. i., on Whales, page 261). We shall deal with the matter, which is a tedious one, in as short a manner as possible. Twisted ropes are taken about the thickness of a cable, to which is attached an iron chain, furnished with a very strong and sharp hook. On this hook a piece of ox meat is placed for a bait. The braver part of the men row up to the place selected. The Whale, as soon as it scents the bait or sees it, makes for it with haste and avidity, and, unsuspicious of treachery, takes in the whole hook. This causes a serious wound, and it at once attempts to get rid of the iron chain to which the hook is attached. After a long ineffectual effort to do so, and goaded to madness by the excruciating pain caused to its vitals by the constant pulling back and forward of the hook firmly imbedded within it, it plunges to the bottom. Then the hunters slacken the rope, which is furnished with air-bladders at various intervals.

VII. The Whale, having plunged to the bottom, remains quiet for some time, but the bladders keep the creature, though wishing to rest, from

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doing so, because the air in them tries to come to the surface. The Whale now rouses its anger, and pursues the bladders with the intention of punishing them, and under the impression they are the creatures that are causing it pain. The bladders, dragged along by the ropes from above, flee before it. The Whale, as is its custom, sinks again to the bottom. The bladders sink after it. The creature, which has drawn the bladders after it, is in great pain, and gets in such a terrible fury, that, lashing the waves around it, one would think Eolus himself was lodged beneath. The Whale, after a long and weary struggle, and with its strength now almost gone, is compelled to follow the rowers who pull the rope in the nearest boat. Then at a given signal the hunters approach it with their boats, and amidst mutual cheering and encouragement, with great courage and in the midst of loud shouting, as if they were in the middle of a battle, they proceed to attack the animal. The Whale is now surrounded on all sides by the hunters armed with javelins, harpoons, prongs, scythes, axes, knives, and spears. The Whale endures the blows showered upon it undisturbed, and spouts forth great masses of water from its blow hole. The hunters endeavour to drive it towards shore, piercing it with constant wounds, and not without danger to their own lives. The merchants and their comrades

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help them to close up its blow holes, and last of all to kill it outright when it is divided amongst them. The East Indians indeed have a different method of taking it, and one attended with greater risk, and requiring greater courage for its accomplishment. They leap on the creature unawares, and ride on its back, and then by piercing it deeply with bamboos, they close up the air-holes and thus despatch it. An extremely clear account is given by Gothofredus. (Part i., page 13, *History of West Indies.*)

VIII. We can see from the above account, the meaning of Job's words in speaking of the Leviathan. They denote the extreme difficulty and not the impossibility of capturing and killing the Whale. Surely the Whale can with the greatest difficulty be brought alive into the possession of man. Its ferocity is indomitable, its strength incredible. None dare attack it in the open sea. It sinks whole ships without any difficulty. It is a remarkable fact that ships newly painted have a great attraction for whales by reason of their smell. The creatures come up to a vessel and rub themselves against it. The sailors, somewhat in fear for the safety of their vessel, throw out painted barrels to induce the Whales to leave the ship, and the Whales play and sport with them. The Batavians, English, and the Danes take the Whales annually on the coasts of Greenland and

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Iceland, and that, too, in considerable quantities. The Indian Ocean is said to breed the largest size of Whales. The writers on such subjects tell us that Whales have often been seen whose eyes and eyelids were like a soldier's head with a large helmet on it. Again, Rondeletius, quoted by Sperlingius, has the words—"I have seen the penis of a Whale of such a size that, when moved by a powerful man, it yet reached the ground on either side of him. From this one can get an idea how hnge it must be when the Whale is roused by desire." This gives us also a clue for measuring the rest of the body. The mighty Creator herein glorifies his own majesty, first by the example of the Elephant, and then by that of the Behemoth. "Who then," he says, "can resist my countenance?"

IX. Let this suffice for the Whale. We need not describe it more minutely, for the same reasons, and for others, that we refrained from going into detail about the Elephant. Nor, again, need we enter further into the subject of the method of generation, tenacity of life (which, from the evidence of zoologists, seems in the case of both to extend to 300 years), or several other points connected with them. Our position is, that by the Behemoth is meant the Elephant, and by the Leviathan the Whale. We have rested our proof on the principles and doctrines of

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natural history. We are so far, however, from turning aside from any one who has a better theory to propose, that we shall reverence him the more. The works of God are manifest, and always to be magnified. Can there be as much power and majesty in the irrational creature as there is in the Creator Himself? He has thrown a veil over his divinity in all things, nor has He left Himself anywhere without a witness. 'Tis ours to admire, to search, to obey, and to adore.

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On the Dragon,

BY

GEORGE CASPARD KIRCHMAYER.

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PREFACE.

ON the sixteenth of October of this year,* news was brought from Rome of a Flying Serpent that had been killed by a hunter after a severe and dangerous struggle. This story, which appeared more like some fable than real truth, was a subject of discussion among the learned. The circumstance was denied by many, believed by others, and left in doubt by several. We have heard the opinions of men on this subject, even though it be itself a mythical one. May their memory be allowed to rest in peace, and their great names be undisturbed. Day unto day showeth knowledge. We owe also a debt of gratitude to those who have investigated the subject according to the best of their powers. Nature will be our model, truth our quest: God our helper.

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The Dragon.

CHAPTER I.

The Nature of (Serpents) Dragons.

CONTENTS.

1. Various etymologies of the word Dragon.
2. Different things to which the name may be given.
3. The same continued.
4. Synonyms of the word.
5. Definition of the Dragon. Its antipathy to man.
6. Passages of Ælian examined.
7. Different views brought forward. Size of the Dragon.
8. Examples.
9. Great Strength of the Dragon.
10. Antipathy to the Elephant. Numerous instances thereof.
11. The native country of the Dragon.
12. The Dragon is the king among Serpents.
13. Its poisonous nature. It has no breasts.

I. The derivation of a word is far from being an unworthy subject of investigation, as we are frequently told. Becmannus,* following Ambrosius

* Christian Becman, a forgotten Theologian, who died in 1648.

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Calepinus,† derives the word Dragon from "derkein," that is, "to see," or look. The reason of this is, that the Dragon is an extremely quick-sighted creature. Hence it is represented in the poets as guarding treasures and prisons. Another explanation of this derivation is that it is very watchful and wakeful, like other cold-blooded creatures. To the Dragon it is, I believe, that Ovid addresses the verse—

Terrigenesque feras, insopitumque Draconem.

Jul. Cæs. Scaliger gives a somewhat different account—namely, that it is derived from "dran," to do, and "achos," pain, because it is a poisonous and deadly creature. His words are—"Grammarians and good authorities have derived the word Dragon from "derkesthai." My opinion is that it should rather be taken from "dran" and "achos." It is of little consequence to our present subject which of these two accounts is taken as the right one. Perhaps it is not an error to go to a Hebrew source for the derivation of this word. In this language "darak" means he has "walked or gone;" hence comes "darek," a "way" or "path." Thus not only do the letters agree exactly with their original, but the thing signified corresponds

† Ambrosius Calepinus was the author of the celebrated Dictionary that is indissolubly connected with his name. He died in 1510.

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exactly with the term. These creatures move by creeping, and by a series of small leaps. The Dragon is the largest of the Serpent tribe.

II. The term itself (to pass on to its different meanings) is usually applied not only to men and brutes, but also to plants and to a certain mountain. Draco was that well-known ancient, stern legislator of Athens, who wrote his laws not in ink, but in blood. (We take this statement from Demas' *Apud Dul. Gellium*, bk. xviii., chap. 12, *N. H.*, and from Scaliger, *Exerc.* 112.) That these laws were, however, abrogated by Solon on account of their excessive severity is well known to every scholar. There was also a certain Dracus, leader of the Achæans, who was conquered by Lucius Mumius, a Roman general, as Livy tells us (in his *Epitomies*, bk. lii.). The greatest, however, of this name is the famous Sir Francis Drake, of Plymouth, who last century sailed round the world to its very limits. A man at that time second to none in naval glory, he was learned in the laws, pursuits, customs, habits, and other remarkable points of many peoples. There is a sea fish which is commonly included among the animal creation under the name of "the dragon." Without reference to Scaliger, we cannot determine whether this creature differs from the Sea Spider mentioned by Pliny, bk. ix., chap. 48. We know, indeed, that Scaliger calls this the true

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Dragon as distinguished from the false. The following are his words :—

III. The creature is called the Dragon, not from its shape, but from its hurtful nature. It is a long and thin animal, while the true Sea Dragon is quite different. There is a dried specimen in France of this shape, and without feet, but furnished with bat's wings. Its head is serrated, and its crest comes to a peak on its head. It has a flexible tail, two feet in length, and bristling with prickles. The skin is like that of a skate." We also meet with a "Dragon" among the catalogue of plants. Old vine-shoots which have borne the brunt of many years are called 'Dragons' from their knotted appearance. See Pliny, bk. XVII., chap. 22., *Nat. Hist.*, and compare Scaliger Exerc. 169., page 2. I shall not now speak of the dracunculus. We have now to refer to the mountain which bears the name of Dragon. We shall be brief. It is situated in Asia near Imolus. Imolus lies in Cadmus. Pliny should be consulted, bk. V., chap. 29. These meanings are, however, all foreign to the present discussion. Our present purpose is to speak of the Serpent of this name, and to describe it. We shall now proceed to this.

IV. The different names of the Dragon are as follows:—In Hebrew "tanin" means a Dragon, but it also means a Whale. Derivation of the Greek

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"Drakon." We have to notice how the Greek termination "on" becomes "o" in Latin. It is quite a usual change. Thus Leon becomes leo; Dion, Dio; Lacon, Laco. The Dragon is called the King of Serpents, as the Regulus is the King of the smaller kinds of Serpents. That the Dragon should be called a Winged Serpent is neither a new fact nor a remarkable one. I shall give a reason for it further on. It is known to some as the "ringed" and "large" Serpent. Franzius answers a questioner on the subject with the words:—"The Dragon is nothing else than a Serpent with coils of a marked nature and swollen by some means or other. Hence arises the common saying—"Unless one Serpent swallows another, you cannot have a Dragon." By the French it is called Dragon, by the Italians, Dracone. By ourselves through a rare agreement of pronunciation it is called der Drache.

V. We have now to proceed to the main matter under discussion. The Dragon is without doubt a Serpent of the largest size, of terrible strength, fond of waste places, the King of the Serpent tribe, and especially marked by the strength of its tail. There is nothing surprising in the fact that a medley of purely accidental qualities should be chosen to distinguish this creature when very little is known of its shape. It belongs to the genus of Serpents, and is a reptile of warm blood, cunning,

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poisonous, and a deadly enemy of man. The original antipathy between man and the devil has even extended to the natural Serpent. Although B. Franzius quotes examples from Ælian and other writers of a certain sympathy between man and the Dragon, yet this cannot be taken as evidence for every day experience. The Dragon is no more a friend of the man who happens to protect it against its destroyers than are the lion, eagle and wolf, animals which in rapacity and cruelty are certainly second to none. Many things are said in favour of the tribe, but the case is thus misunderstood. The Devil himself frequently lurks under the form of a serpent to deceive man. Deep-seated in our mind, there remains the remembrance of the great deception that old and wicked Dragon the Devil wrought in our first parents. Let him who wishes find love in his heart for the Dragon. I neither give it nor take from it any feeling of such a kind.

VI. I am not ignorant indeed of what Ælian says of the infant Arcas and the Dragon. My answer is a short one. There have been mixed up with the truth, several mythical details. I think one might as well put faith in what the same zoologist tells us elsewhere, (viz: Bk. VIII., chap. 9., Aleva) about the Dragon that fell in love with a girl in Idumæa. Here Ælian gives us a flowery little sentence. He says—"Animals are therefore

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not devoid of reason." Yet even though it be granted that Dragons have fallen in love with beautiful boys or girls, I maintain that they did not act thus by reason of a desire for man or for his beauty. They pretended to be his friends, not for his, but for their own profit. Ælian himself (bk. viii., chap. 9) certainly says—"It is the nature of animals to love not only their own kind, but even others which may be beautiful." We have been somewhat prolix in the above statements because of the universal false tradition that has settled in credulous minds. Similar tales are common about lizards. But let the man who wishes to keep clear of harm, beware of those who practise deceit.

VII. We have begun with its size, for it has a vast body. In respect of size, it occupies exactly the same position among reptiles that the Elephant does among quadrupeds. The famous Alexander, whom we call the Great, on account of his great achievements, met with Serpents of great size, (viz: 16 cubits long) when on his great expedition to India against Porus. Ptolemy, King of Egypt, required an army of armed horsemen to attack a Dragon of great bulk, and 30 cubits in length, which after great risk to his own life, and after the death of some of his followers, he only managed to kill at last by stratagem. Diodorus Siculus, as quoted above, gives us a long account

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of this event, (bk. iii.) In India Dragons grow to such a size that they can swallow both stags and bulls, as Pliny tells us, bk. viii., *Nat. Hist.*, chap. 14.

VIII. In the same place he tells us how in the time of the Punic War, (*i.e.*, the Second Punic War, as we can gather from Livy, bk. xxx), beside the river Bagrada (which as Dalechampius tells us is now called the Megerada) a Prince of Attica went out at the head of his whole army and attacked, as it were a city, a Dragon 120 feet in length, nor did he stop until he had put it to death.

In the lives of the Kings of Poland, a story of King Cracus (who built Cracow) is often met with. There was a Dragon which lived in a rock, and which when compelled to do so by hunger, used to creep from its cave and kill many people. Three oxen were daily brought to the cave of this monster. The King of the country moved with compassion for his people, ordered at last a calf's skin to be filled with pitch, sulphur, and nitre, and offered to the beast. The Dragon was deceived by this trick, and with one bellow from its vitals perished on the spot. Compare Florus Polonicus, John Pastorius, bk. i., chap. 3. Those who care for further information, should consult Ælius lxv., c. 21., and especially M. Paul Venet. bk. ii., chap. 40., p. 381. *History of Tartary*

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IX. We shall now proceed to the second characteristic of the Dragon. This is its terrible strength. This fact is proved by its vast stature, its insatiable voracity, the difficulty of capturing it, and the symmetry of its limbs. On the former points we have already spoken; on the last we have something yet to say. Another Dragon, with which Alexander the Great had a fight in the arena, was 70 cubits long when only part of it was seen, and had eyes, as Ælian states, as big as a large round Macedonian shield. M. Paul Venetus has seen Dragons larger than this in Caraiam, a province of Tartary. It is no wonder that these creatures fight with the Elephant itself. By winding their coils round their legs, they squeeze them so tightly that the huge beasts cannot move. Then by raising their necks under the trunk of the Elephant they strike their fangs into its eyes, and, blinding its vision by their fiery and lightning-like glitter (I use the words of Diodorus Siculus), they dash it to the ground, and then tear it to pieces.

X. They are the sworn foes of the Elephant, and there is nothing so large, so wild, so powerful, or active which they will not at any moment fight either as an equal or as an inferior.

The antipathies in Nature are remarkable. Thus there is enmity between the lion and the scorpion. The poison of the weasel is instant

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death to the Basilisk, the most poisonous of all Serpents. The gadfly is the crocodile's enemy. The ichneumon hates the asp with all a step-mother's hatred. The newt is the deadly enemy of the scorpion. Mice and cats are sworn foes. Cats and dogs are seldom found to agree. The chameleon and snake, the stag and hawk, wage constant war. The cock flies before the kite, the sheep is the victim of the wolf, the hare that of all.

It must, however, be noticed here that we are far from believing that every single Dragon attains to the same point in respect of size or strength. The individual varies with the locality, with age, and with other circumstances. It has never been gainsayed but that the largest Dragons are found in India.

XI. A third point in our description of the Dragon was its native haunts. It is an inhabitant of desert places. It loves marshes, secluded and inhospitable spots. Hence it is called especially the inhabitant of the desert. Malachi i., 3. In the sacred writings God is described as going to make a lasting devastation. "It shall be a habitation of Dragons and a court for the daughters of the owl. The wild beast of the desert shall also meet with the wild beast of the island, and the satyr shall call to his fellows." The same horrible desolation of Dragons is foretold in Isaiah, chap. xiii., v.

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22. Compare Job. xxx., v. 29. Hence, also, they are commonly found in untrodden forests and caves. "The young of the Dragon (says Franzius) feel extreme thirst in the middle of summer, and where they are unable to get water, their cries, like those of the ostriches, are terrible to hear." Yet they are said to be commonly found in Lybia, Egypt, Arabia, Æthiopia, and India; that is, in countries well known to be very warm in climate.

XII. Further, our description of the Dragon included the right of dominion (so to speak) which it wields over other reptiles. Thus, from its incontrovertible supremacy, writers have given it the name of "king." Although the basilisk must not be cheated out of its name and dignity, yet it must only be taken into consideration when speaking of the smaller reptiles. The Dragon is the largest, bravest, most powerful, and most formidable of all reptiles. These are all royal prerogatives. Last of all, our description of the Dragon included an account of its natural armour. For its strength lies in its tail, and it can use it to such good effect that elephants of great bulk fall before it. In the same way the elephant itself fights with its trunk, the lion with its claws, the horse with its hoof, the ox with its horns, the boar with its flashing tusk, and the wolf with its teeth. No power can avail to release anything once folded within the embrace of its enveloping coils.

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If small snakes and small or ordinary Serpents can break a man's arm, what must we think of the power of the Dragon?

XIII. Is the Dragon equally powerful by reason of its poison? This has been a question among scholars, and a negative answer has been given by many. Pliny has denied (though wrongly) all poisonous qualities to the Dragon, saying, "The Dragon has no poison." But seeing that it is a Serpent, and that experience gives evidence of a contrary nature, we can put no trust in Pliny on this point, for the Dragon does poison the air. Some have attributed breasts to the Dragon from an erroneous interpretation of *Threnius*, chap. iv., vers. 3. It is not the Dragon, but an animal of higher rank, that is here meant, as Franzius clearly shows, and he is followed by Sperlingius. The evidence of our own eyes also infallibly proves it.

CHAPTER II.

On the Varieties of the Dragon, and chiefly on Flying Dragons.

CONTENTS.

1. The Variety of Dragons.
2. Dragons are admitted to be both winged and flying. Cardan noted.

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3. A recent piece of evidence from Rome proves this. A monster taken in Ireland last month.
4. Evidence of Matthew Merian, Breuning, and of Benzo, as to Dragons with wings.
5. Confirming evidence of Paræus, Scaliger, Nierembergius.
6. D. Thom. Bartholinus following Franzius takes the same position as we do.
7. Does the Dragon then belong to the bird species. No. Reasons given. The bat is no bird.
8. Flying-fish are also admitted to exist. Evidence for this.
9. Conclusion.

I. We do not wish to give a decisive opinion either one way or the other, as to whether the Dragon is a distinct species, or merely a variety of a genus. Distinguishing characteristics can neither be derived from the places wherein it is found, nor its size, nor even from the variety of its colour. English and German dogs, however much they may differ from one another in magnitude and in locality, are yet one and the same species. Such a distinction as that implied in the present subject, could only be brought about by a very distinct configuration of certain parts of their bodies. Some, says D. Franzius, are furnished with feet and wings, some not. Some are red, others black, others of an ashy colour. Some are 5 cubits long, others are 10, others 30, others 40. Johannes Eusebius Nierembergius says:—"It can coil itself up into a high coil, and thus contract its size, as Philippus Pigafeta tells us in his description of

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the Congo. There is there found a two-footed animal of the size of an egg, and with the shape of a Dragon. It is winged, and has a long tail. Its head is also long, and its mouth is furnished with several rows of very sharp teeth.

II. There are, therefore, some Dragons with and some without wings. In saying that there are winged and flying Dragons, we know we have to meet the scepticism of Cardanus, and the downright opposition of others, who on other points are considered amongst the most circumspect of modern writers. These men maintain that flying and winged Dragons must be brought under the head of the mythical. But even the well-known incident reported from Rome has appeared to very many ridiculous and absurd. I quote Cardanus:—"I saw," he says, "at Paris five two-footed creatures with very small wings, which one could scarcely deem capable of flight, with a small head, with a head like a Serpent, of of a bright colour, and without any feathers o hair. The size of the largest of the five was about that of a small rabbit." The opinion of Prof. Daniel Lagus is worth quoting—"We must not, from the weakness and small size of these little Dragons, rush precipitately to a conclusion regarding the whole species." We shall not at present quote any further authorities.

III. The story that comes from Rome has

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given us an opportunity of doubting previous ideas on this subject. The spectators of the fact have vouched for the certainty of the story. On the 27th of October, 1660, the following circumstance was described as occurring at Rome:—A "winged Dragon appeared in the Campagna, which, after wounding a hunter, was killed. Yet the hunter himself eight days after (doubtless by the influence of the poison) expired, and his whole body became of a green hue." We shall not here trouble ourselves with the question whether the Dragon is a stranger to or an inhabitant of Italy. At the same time, I would be unwilling to believe that the creature flew by itself across from Africa or Asia over so many miles of country, and I should be the last to state it as a fact. For even in our own European countries some monstrous births occasionally take place. For instance, last month (on the 6th of November) at the Hague there was found a certain naked wood monster, a male completely covered over with hair, and which the poets used to call by the name of Satyr, who was surrounded by hunters and killed. What are we to make of this? We shall speak of this not now, but later.

IV. This is the point we have at present to demonstrate—that there are such things as flying and winged Serpents. I use the word winged in the sense of furnished with wings, although not

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with feathers. Let me quote some writers on this point. Matthew Merian, in his *History of the Antipodes*, part ii., page 211; next, the well-known and learned Eastern traveller, Joan Jacob Breuningus, chap. 26, says:—"I saw, among other things, a certain extremely tall and huge two-footed Serpent, furnished with a pair of wings like the bat." Hieronymus Benzo, in his account of the New World and of the French expedition to Florida, chap. 4, p. 480, says:—"I saw a certain kind of Serpent which was furnished with wings, and which was killed near a wood by some of our men. Its wings were so shaped that by moving them it could raise itself from the ground and fly along, but only at a very short distance from the earth." We have here occular proof: we should surely admit other proof after this.

V. Ambrose Paræus, formerly chief counsellor to the King of France and a doctor of Paris, in the first book of his *Studies in Surgery*, page 51, quotes from Pliny that Dragons were found in Ethiopia of the length of 10 cubits. "But," he adds, "in India there are bird creatures of 100 feet in length, which fly to such a height that they pounce on their prey from the middle of the clouds." Evidence on this point is to be found in Scaliger also, Exerc. 183, sect. 5. The words are—"The mountain range which divides the kingdom of Narsinga from Malabria is the haunt

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of many wild beasts. Among these are winged snakes, which hide among the trees. These are said to kill those who come too near them by a single hiss, or even by a look." (This is surely an exaggeration.) John Eusebius Nierembergius, a leading naturalist, agrees with us in our view of the subject. See the 12th book of his *Natural History*, chapter 36, page 282.

VI. Franzius, again, was far from being of an opposite opinion to us when he wrote in the 4th part of his *History of Animals*, chapter 5, page 741, the words—"There are two kinds of true Dragons. Some are winged, with a kind of pinion made of membrane, and which have their wings not composed of feathers, but of membrane fastened to the back instead of ordinary wings. The great Thomas Bartholinus, also, the son of a great father, in his Treatise, published at Pavia (chap. 7, p. 50), on the Unicorn, has painted in vivid colours, and with faithfulness to the original, a flying Dragon in the museum of Tobias Aldinus. The skeleton of this creature Louis XIII., King of France, gave as a present to Cardinal Francis Barberinus some years before.

VII. Nor let any one object that whatever flies is a bird. It would not be sufficient evidence for the matter in hand. What are we to say to the bat? It is a flying creature, but it is no bird; notwithstanding any restrictions

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Franzius may put upon his admission of the fact. We can easily adduce proof if required. It is not an oviparous, but a viviparous animal. Now, birds lay eggs. It is not furnished with feathers, but rather with wings and hairs. Nay, it has also got breasts, and likewise suckles its young. Again, it has teeth; it has long ears and pointed teeth. It squeaks like other mice. I quite deny, therefore, the validity of the argument of those who place the bat among birds. In this way we should be compelled to include the flying fishes for the same reason among the birds—a very absurd idea.

VIII. There are, without doubt, such things as flying fishes. I shall not speak of Scaliger, where he criticises Cardanus in the words—"You write you have seen the dead bodies of flying fish: I have seen them alive. In the Gulf of Venice, between Venice and Ravenna, and more than two miles beyond Quioza, in the year 1550, a flying fish was caught, as Ambrosius Paræus tells us." (*Studies in Surgery*, bk. xxiv., p. 736.) Andrew Thevet, in his *History of the World*, writes that when he sailed across to the New World, hundreds of flying fish, called by the inhabitants of the forests Bulambech, were met with. These creatures leapt up from the sea and passed over 50 yards in their flight, and by frequently striking on the sails or mast became food for the sailors.

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A confirmation of the same statement is to be found in the *History of Brazil*, by John Lerius. The Normans, under Duke Nicolas Durence Villagogne, a Knight of Malta, captured an innumerable quantity of flying fish. See a detailed account of this fact in the *History of the Antipodes*, by John Lewis Gottfried, to be found in Matthew Merian, p. 318, in his *History of the West Indies*.

IX. Does any one think of giving these fish the name of birds because they fly, forsooth? In fact, just as the mere possession of the power of flying does not argue conclusively for the creature possessing it being a bird, so also the absence of it does not prevent the creature in question from being one. Thus the ostrich, though devoid of neither wings nor feathers, cannot fly; but all the same it is a bird. Just as, again, because we cannot deny the power of swimming to the Dragon, are we to class it as a fish? Man, the dog, the diver, the frog, pumice stone, and apples, have all the power of floating. There are, besides, insects, worms, caterpillars, bugs, and so forth, which have the power of floating. A subject is to be studied and determined, not by properties which it has in common with others, but by those which are peculiar to itself, and not by some only, but by all. We here conclude our remarks about the Dragon.

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On the Spider,

BY

GEORGE CASPARD KIRCHMAYER.

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PREFACE.

THE Spider is a wonderful architect. It is to this clever little creature and its flimsy threads that we owe our idea of subtlety. The scholarly Scaliger, *Exerc.* i., sect. i., *On Subtlety*, says :—"It would seem that we have derived the word from the idea of fine threads, which in a finely spun web escape the quickness of the eye. Hence a part of the signification has been taken and applied to other things." We look up to geometers; we wonder at rope walkers; we admire weavers, whether men or women. These things are all very well. But we never think of looking at the Spider, because it is an every-day occurrence, and can be

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seen by every one. Thus everything, though endowed with admirable qualities, if only it is common, at once falls in our estimation. Thus the greater number of scholars there are, the less do we think of them. Solomon, in the far past, was struck with admiration of the Spider, and even in the present day we admire and watch it. It is a born geometrician, rope walker, and weaver: not a made one. It is wise without a teacher, shrewd without a guide, skilful without a master. Its subtle powers must be investigated, and may God help our endeavours.

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The Spider.

The Spider. A particular Investigation.

CONTENTS.

1. The Spider praised by various writers.
2. The etymology of the word.
3. A double meaning of it explained.
4. Continuation of the same.
5. Synonyms of the word.
6. The nature of the Spider. The distinction drawn between perfect and imperfect animals rejected.
7. The shape of certain of its parts.
8. The Spider very poisonous. To the fowl, however, it is harmless.
9. Its foresight and cunning, as quoted from Pliny.
10. Seneca's judgment praised. The claim made by some for knowledge on the part of brutes and the conception of finite purposes denied.
11. Various proofs of this.
12. The method of generation of the Spider, as shown by Aldrovandus.
13. Difference of opinion as to the composition of the material formed by this creature.
14. Democritus defended. Aldrovandus criticised.
15. Proof given.
16. Its home, food, time of spinning, age, and antipathy to other creatures.

I. This is the little creature on whom Nazianzenus has bestowed higher praise than he has on

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Euclid. Aristotle, in treating of the skill of insects, after saying that he considers the race of ants and bees before and excelling all animals in industry, adds that the Spider is the more skilled in the business of its life. This conclusion is come to both from the fact of their workmanship in weaving their webs and from that of their industry in working and hunting. The great Magnus Aldrovandus believes that it could only have been from the Spider that weavers, linen-weavers, and tapestry-workers learnt their arts, whether we regard the perfection of their fabric or the symmetry and indissoluble combinations of their complete web. The words of Claudian Ælianus on this point are learned and well chosen (*Hist. Anim.*, bk. vi., chap. 57). We shall first consider the term, and then the subect it involves.

II. The terms "araneus" and "aranea" are quite interchangeable, though Suidas does not agree with us on this point. Greek furnishes us with the immediate origin of the word. The term "arachnes," or "arachne," is the same in Greek as "aranea" in Latin. We thus see that the "ch" has been dropped and "a" added. Although, like Aldrovandus, many wish "arachne" to be derived from its having its "ichne," or foot-marks, very indistinct, or from its taking away these footmarks into the "aer" or air, yet we shall, without disparaging any, give another

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derivation of the word. "Arachne" surely comes from the Hebrew, meaning "it has woven," or "it has spun." Indeed, is the name of a Lydian girl, daughter of Idmon, who, as Pliny tells us, was the first inventor of linen and network. This Arachne, if we are to follow the stories of the poets, did contend with Pallas for the palm of good workmanship. She is said to have lost, and to have been turned into a Spider by the victorious goddess. And it is thus, they say, that "aranea" is derived from "arachne." Ovid is worth consulting on this point. (*Trans.*, bk. vi., fables 1 and 2.)

III. Now, to keep clear of all danger that might arise from a doubtful acceptation of the word, we have to take note of some errors that have been made. For (1) there is a sea fish which is called the Spider. It has eight feet, very long in proportion to its body, which is small. This is the reason of its getting the name of Spider. This fish is itself, as Bellonius tells us, very common in every sea. Others refer it to the crab genus. By the Latins it is called the dacunculus, or sea dragon. By the French it is termed vive, because when caught it can, contrary to the nature of other fishes, live for a long time out of water. The English call it viver; the people of Marseiles areque. Pliny, bk. ix., chap. 48, and bk. xxxi., chap. 2, *Nat. Hist.*, should be

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consulted on this point. (2) The Aranea or Spider is an animal of the weasel or mouse kind, with a poisonous bite, which destroys anything that may cross its path, as Pliny holds, bk. viii., chap. 58. (3) The Aranea, again, is the woolly or hairy seed that grows on the willow. Pliny, bk. xxiv., chap. 9, *Nat. Hist.*, says, "The fruit of the willow before becoming ripe becomes woolly."

IV. Again (4) the term Aranea or Spider was formerly applied to a certain part of the astrolabe. Cælius, indeed, when treating of the gnomon and astrolabe and their parts, bk. xii., chap. 9., says:—"The third part is called the Dicptrice, containing in its sheath the membranes on which are drawn the equator and the tropics. Then over these membranes is drawn what is called the Aranea, in which is the zodiac, etc." (5) Again the term Aranea is even taken to mean a peculiar blight among olive trees. It is a kind of bug or some small worm, as I gather from Scaliger (*in Theophrastus* iii.; *On the Disease of Plants*, chap. 20). We may consult and add the testimony of Pliny, bk. xvii., chap. 25., *Nat. Hist.* We must not however be too diffuse. Again (6), the word Aranea often means the web, or the effect, as well as the Spider, the cause. (7) Nor is it uncommon to use the term as applying to that meteoric phenomenon (called the threads of the

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blessed Mary) which commonly in spring and autumn moves in a circular path through the atmosphere. On the term arachne or aranea as denoting the proper name of a girl, though the fact was mentioned above, there is no need of more than ordinary attention. Neither of these meanings have any thing to do with our present subject. The former of these words however (Arachne) we shall treat of in the sixth paragraph.

V. Different names for the Aranea must now be given. By the Hebrews it is termed Yakarish, which stands for the creature as well as the web. By the Greeks it is called Arachnes, and Arachne indifferently, just as the Latins use Aranea and Araneus. Suidas, indeed, does draw the distinction that Arachnes is the animal and Arachne the web. But the truth is that this distinction as we have already said is worth nothing. Thus in Dioscoris we find the creature "Arachne;" and in Plutarch the works of the "Arachne." By the Germans it is called the spinner, from its spinning or rather *vice versâ*, the term spinning being derived from the spinner. For from its work the art of weaving (as Beckmann says in his "Origines" p. 338) took its beginning, just as the art of sewing did from the workmanship displayed in the leaves and bark of trees, or architecture from the empty caves of nature and the nests of birds; or as the art of flute-playing sprang from the sound

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of water, or the sigh of the trees. As Lucretius says:—

> Zephyri cava per calamorum sibila primum
> Agrestes docuere cavas inflare cicutas.

VI. To proceed, however, to the real subject of our discussion. In our opinion the Aranea is an eight-footed insect, poisonous, endowed with great foresight and cunning, and oviparous, and especially remarkable for the web which it weaves from out of its own body with wonderful industry. We have put it down as an insect. The reason for this is not far to seek. Insects, are small and weak animals. As is the case with the bee, the fly, the butterfly, the locust, the worm, and the ant, so it is with the spider. One cannot strictly refer insects to the flying, creeping, wading, or swimming classes. By the Greeks they are called entoma. That is either from the incisions and marks with which they are ornamented either on their back, belly, or on each side of their body. We cannot admit the distinction that has been drawn between perfect and imperfect animals, nor can we say to which of the two classes the Aranea belongs. Insects have all that is necessary for them to have. This is the case with the bee and the ant, and is true of the Aranea as well. If they had other additional qualities they would no longer be the bee, ant, or Aranea,

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but something else. "God beheld everything that he had made, and behold it was all very good." Now, what is good is perfect. Conceive goodness, and then call it imperfect in its essence. You will have badness, not goodness. Suppose a distinction is drawn between absolute and relative perfection, and we enquire into the meaning of the former term. We should lose ourselves altogether. An enquiry into the meaning of the latter idea results in a contradiction. Thus several things would have to be called imperfect which are not so.

VII. Seeing the Spider is eight-footed, it exactly corresponds to the crab. The feet themselves vary in length, according to the various uses they are put to. Some of their feet they use to thin out and lengthen the threads they spin (I quote from Ulysses Aldrovandus, bk. v., *On Insects*, chap. 13, p. 241); others are employed to turn these threads into the web and join them together; with others, again, they run along these threads, and hang motionless from them when they like. Their front and hind legs are the longer, the middle ones the shorter. With the hind feet they arrange their threads and join them in the woof with inimitable skill. Their front ones they use as hands, and seize the prey that falls into the webs; their middle limbs are used to help them in this. Thus do we learn that

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God has given nothing to the world without its use.

VIII. But secondly. We described the Spider from the point of view of its being a poisonous creature. The remarks of the late Sperlingius help us at this point (chap. 6, *On Insects*):—"The poison of the Spider when taken by man, whether in eating or drinking, gives great and terrible suffering. The patient is troubled sometimes with fever, sometimes with stiffness, sometimes with itching, and sometimes with swellings. Spiders are eaten without danger by cocks and other birds. Thus, though poisonous to some, it is not so to all." There are many herbs poisonous to us, such as the napellus and hemlock, which are harmless to brutes. Pigs delight in the stinking excrement of other animals. Such possesses neither any useful nor attractive qualities for us. Several kinds of small birds feed on various worms, while we eat these birds without harm. Thus what is a pest to one is not so to all. Men often die in heaps when the brutes are untouched, and again the latter perish when the former remain unharmed. Again, the Spider does not inject its poison by striking, like the scorpion, but by its jaw, or bite. Hence as soon as they capture a fly they fetter its legs and bite it, and, as the poets say, breath a poisonous breath on it, and last of all kill it outright, after

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they have sucked every drop of blood from its body.

IX. Again (thirdly), our description of the Spider included its faculty of foresight and cunning in the subtle work of weaving its web. The ant, indeed, is a foreseeing and cunning creature, but it is far surpassed in these qualities by the Spider. The silkworm, though of wonderful industry and skill, is far surpassed by the Spider. The scholarly words of Pliny are striking (*Nat. Hist.*, bk. xi., chap. 24):—"With what delicate touch, with what fine thread and equal, does it construct the main supports of its web, using its own body as a counterpoise! It begins to weave from the middle, and works in a circle, joining together the cross threads. Leaving spaces at certain intervals, but gradually increasing from the middle, it fastens the whole with an indissoluble knot. With what wondrous art does it conceal the snares that lie in wait for its prey in the chequered nettings! How little, too, would it seem that there is any such trap laid in the compactness of its web and the tenacious texture of the woof, which would appear of itself to be finished and arranged by the exercise of the very highest art. How loose, too, is the body of the web as it yields to the blasts, and how readily does it catch all objects which come in its way. You would fancy that it had left the thrums of the upper portion of its web

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unfinished. With what architectural skill, too, is its web arched over, and how well defended by a nap of extra thickness to keep out the cold. How carefully, too, it retires into a corner and appears intent on anything, all the while that it is so carefully shut up from view that it is impossible to perceive whether there is anything within or not. And then, too, how extraordinary the strength of the web when the winds blow on it! When is the wind ever known to break it, or any accumulation of dust to weigh it down? The web often stretches between two trees when the creature is exercising its art and is learning to spin. The thread stretches from the top of the tree to the ground, and up this thread the Spider passes and repasses, and weaves at the same time the threads required. Then, when a victim has fallen into its power, how ready it is to run and seize it. Though it be caught in the extreme outside of the net, the Spider invariably runs to the middle, because by so doing, and by shaking the whole fabric, it most effectually entangles its victim. Then it repairs the rents made, with all a tailor's exactness."

X. Again the words of a wise Roman are most apposite. "Seest thou not what skill the bees have for making their own cells, what concord reigns among them for executing the work given them

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by a divine Providence? Seest thou not how inimitable is the web of the Spider? What a work it is to arrange the threads, some of them placed in straight lines as a foundation, others running round in a circle, and becoming fewer and fewer as the centre is left. Their object is to capture the small creatures as with a net." This happy phrase is worthy of immortality. "The Spider's art is inborn, he says, not learned;" for the young Spider as soon as hatched has a complete knowledge of the art of weaving a web, and begins the work. It has not seen, nor has it learned wisdom from former experiments. Without doubt these and other skilful animals possess their knowledge as a gift of nature. Following the interpretation of D. Freitag (*Disp. Anti. Sperling. de Orig. Form.*, th. 19), and of Dn. Leifold (*in Not. ad Jaceh. Phys.*, bk. ii., chap. 10, p. 171), Melchior Cornoeus (*in Currie. Phil. Tract* 3 *dub.* 14), and John Tatinghov (chap. 8, p. 194), have argued that this is not the case, and maintain that these creatures neither have any thought nor are they endowed with any kind of natural wisdom.

XI. We shall not here enter into the question as to whether nature performs all the operations she does with a distinct end in view. And no end can be a motive or cause to work unless it is recognised as such; nor can there be such a thing as a desire for an end which is unknown. But at

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the same time we do not intend to dwell at great length on the manner in which nature performs all her operations in the wise and regular way that she does; nor on the question as to how the brutes themselves seek out, and accommodate means to ends; nor again do we wish to quote the great names of Tycho Brahe, Armand de Bello Visu, Roderick de Arriaga, Thomas Fienus and others. Let us quote the words of Solomon :—"There be four things which be little on the earth, but they are exceeding wise. The ants are a people not strong, yet they prepare their meat in the summer: the conies are but a feeble folk, yet make they their houses in the rocks; the locusts have no king, yet go they forth all of them by bands. The Spider (not the Stellio as the Vulgate renders the word), taketh hold with her hands, and is in king's palaces." Compare, as especially confirming our theory, the words of Nierembergius, bk. i., *Nat. Hist.*, chap. 18, p. 11.

XII. When talking of the Spider we said it was an oviparous creature. When the female has spun out and shaped its web, the male comes and helps it. When this process has been repeated several times, the process of copulation is gone through, turned in opposite directions. This is rendered necessary by reason of the globe shape of the stomach. The experiment of Aldrovandus deserves notice; he says :—"After examining the eggs of the Spider,

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on one occasion I found them to be numerous, of a moderate size, darkish, covered with small spots divided, separated from one another, and sticky. If any are by any chance lost, the spider makes diligent search for them, and even carries them in its mouth. I have seen likewise from a single egg, innumerable fœtuses born, yet so small as scarcely to be discernible by the eye. Still as soon as hatched they wove threads so fine that nothing could be more marvellous. I have also noticed under the stomach of a Spider which I had caught, a large heap of eggs so small as to resemble atoms.'

XIII. The fifth characteristic of the Spider related to the material with which it spins its web. I maintain that it is from the internal viscous substance of its own body, and not from the outer covering of wool that the Spider spins its web. Aristotle denies this, and laughs at Democritus for maintaining such an idea. The philosopher of Abdera (Democritus) had held that the Spider weaves its web from the viscous substance of its stomach at certain very brief intervals of time. Pliny says:—"It begins its web, and the womb of the creature is sufficient for the material required either by some process of disintegration in its body at a stated time as Democritus says, or from some source which produces the wooly substance within it." Ælian opposes Aristotle, and says:—"The creature does not get its thread

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from any other source than its own stomach, it constructs its hunter's net for the capture of its minute quarry, and spreads it out in the shape of a pole. Then it replenishes its stomach with that substance which it has drained it of for constructing its web." The words also of Ovid long ago on the transmutation of the Arachne into a Spider are very fine.

XIV. It is remarkable that on a subject so clear, Aldrovandus should have committed such a mistake. "Justly," he says, "has Aristotle destroyed the idea of Democritus. For Spiders and other small creatures of the same kind take very little nourishment, and have very little to support their life, on account of the small quantity of blood and heat inside their bodies. Therefore seeing they do not eat so much food as would account for the consumption that goes on in the process of weaving their webs, we should be reduced to the conclusion that more comes out of their body in the shape of surplus matter and excrement than goes in, in the shape of food; a conclusion which is absurd." The statement given here is false, and no consequence flows from it. We shall afterwards refute and answer it. At present, howeverr, let us put Aldrovandus against himself. He denies of Spiders, but asserts elsewhere of silkworms, that they spin their silk threads from their own bodies. Yet the silkworm is an annulose

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creature, and seems only to consume enough food to account for the amount of silk it spins from its body. And a little further on he quotes Vida, an Italian poet—

———effundunt quaesita par aevum
Stamina, dites opes uteri.

XV. But behold when, after the vacation last autumn, I was trying some slight experiments on nature, and was hunting for Spiders of all sizes, I discovered, after repeated observation, that the material out of which they spin their threads is a dark, spotted, glutinous, and sticky humour, very similar to kneaded dough, and of a dark, sparkling hue. It is from this substance that they spin out their fine threads through the womb, which is situated beside the haunches. This process they perform while walking on. On the 7th of September, from a Spider which I had fastened up on a beam by means of a pin I drew out an unbroken thread 66 feet in length. And on the following day, from another Spider of medium size I took a thread, a very fine thread, which, though sometimes broken, was yet 170 feet long when stretched. On pricking the womb of the creature with a needle it was found still to have some of the rich viscous substance in it. Thus when the Spider was dead and cast aside, I have taken threads from it, though with very great difficulty. Any one who

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cares may try the experiment. The Spiders at least cannot be charged with ignorance of this art of spinning. Thus when caught (for they are silly creatures, and when caught in a chip of wood must be quickly thrown to the ground, frightened or kept prisoners in spittle) they suspend themselves and hold on by the thread which they spin like rope dancers.

XVI. There could have been here added some remarks on the native countries, food, usual time of weaving, age, and its occult antipathy to other animals, of the Spider. We give a few on the native country of this creature. There is no country which does not produce the Spider. Nevertheless, near the town of Gratianopolis (it is commonly called Grenoble), in that part of France next to Italy, Grandentius (bk. iv., c. 50, *Memorat.*) tells, as well as Merula in days gone by, that there is an old tower which is quite free from Spiders or any venomous reptile. Nay, further, they say that if any are brought into it they perish on the spot. We see from Aldrovandus, page 241, that the Spider is content with very little food. They feed on juicy and viscous substances, as can be seen both from *a priori* and *a posteriori* arguments, for they usually live by catching flies and bugs, from the bodies of which they extract their juicy blood. Besides, their womb is full of viscous humours. As regards the time at which they

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weave, we have the following remarks to make. They very seldom make their webs when the sky is clear, but only when it is overcast. Hence they foretell cloudy weather. There are also other signs to be drawn from this creature. For instance, they make their webs higher than usual when the rivers are to be in flood, as Pliny tells us. Crowds of flies and Spiders, a most unusual phenomenon, are an indication of pestilence. Our authority for this is Athanasius Kircher, in his recent tract on the *Plague*, page 144. Again, by their leaving a house they foretell it is going to fall.

The life of the Spider is a short and fragile span, for they soon reach their maturity, and what takes little time to create, takes little to die. Again the Spider is a friend to no other animal. The Germans have on this fact founded a proverb. Indeed they often fall upon and destroy their own kind. They are said to wage wonderful wars on the stellio as Aristotle says; again they have an irreconcilable hatred for the toad. See Laurentius (*Cent.* 5, *Hist.* 78, *Acerr. Phil.*) where he gives a wonderful incident that occurred to a British monk.

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On the Sting of the Tarantula,

BY

HERMANN GRÜBE.

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On the Sting of the Tarantula,

And its Cure by Means of Music.

§ I. Symptoms Produced by the Sting of this Creature.

My object being to give an account of the Tarantula, or poisonous Spider of Apulia, so called from Tarentum, where large numbers of them are found, I shall not delay over a long revision of what has been long ago said by other writers, but shall treat of the sting of the creature and of the power of music in curing it, and shall be brief in proportion as others have been prolix. I shall thus have two heads under which to treat my subject, the first dealing with the sting of the Tarantula, and the symptoms arising from it, and the second giving a short account of the power of

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music to heal such stings. The first difficulty which one meets with is the number of symptoms of the poison, which, according to Scaliger, *Exercit.* lxxxv., *contra Cardanus*, is almost equal to that of the days of the week. Those who are stung by the Tarantula are, some of them, seized with laughter, others with weeping, others with continued wakefulness, others with stupor, others with nausea and vomiting. Others, again, have a cold perspiration, dizziness, or delirium. Some run about, others sit listless, and seem as if seized with lethargy. Some are affected one way, others another, and so diverse are the symptoms that some believe there are as many kinds of this animal as there are kinds of affections produced by it. Scaliger, however, dissents from such a view, and considers that such diversity of symptoms arises from a diversity of temperament among those who suffer from the stings, just as the different effects which are produced in people by the excessive use of wine or tobacco arise from the different constitutions of those who partake of these stimulants. And hence it is that we see some patients weeping, others laughing, others sleeping, and others giving vent to their disorder in other forms. It is worthy of notice (a point which has exercised the minds of many men, and is a question disputed as much in the Peripatetic as in the subtle Carthusian school) that this poison

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has a singular affinity for music, which is said to have a wonderful effect in pacifying and curing those stung by the Tarantula. It has, indeed, been noticed that even old men, and those who are almost overcome by the virulence of the poison, have, as soon as they heard the sound of music, begun immediately to stretch their fingers and their limbs, and then to move the rest of their body so quickly and so accurately to the tune which is played that they seem to surpass young men in their vigour and dancing-masters themselves in their skill. Whether, then, the close connection of this poison with music is to be derived from the peculiar nature of this tuneful creature, we shall consider at greater length below.

§ II. Examination of the Nature of this Poison in the Light of the Principle of Fermentation.

The character of this poison becomes, I admit, more difficult to define after the explanation I have given, and, I might almost say, is to be placed among those things, the discovery of which is placed as a goal for human invention. Yet if we can make any assertion in matters which are difficult of apprehension, and in which a desire for their discovery is all we can indulge in, it is worthy of notice that the principle of fermentation,

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which modern thinkers have received in a more enlightened condition, and understood in a stricter sense than before, does seem to throw some light on the clearing up of the nature of this poison. Just as a mad dog does, by its bite and by means of its saliva, that is by the volatile nature of the salt of its body, and the incubation of bad secretions, present an appearance of some fury breeding within it, which is called in medicine hydrophobia, or better, synanche (as D. Meibomius, in one of his elegant treatises cleverly shows in quoting from Josephus Aromatorius); so by its bite the Tarantula inoculates those whom its stings as it were with the evil power of its own virulence, by virtue of an incubation or fermentation which is of a more venomous type. For as the whole idea of the plant lies hidden in the seed of the vegetable, which, on the approach of spring, when the earth is swelling and bursting with her own increase, and the heat of the sun comes and takes part in the forwarding of the process of ripening, is awakened, made to sprout and perfected; so also, in an extremely small particle of what I call "ferment," which is transferred by the sting of the Tarantula into the human body, and immediately afterwards begins gradually to grow, the whole nature of the symptoms is hidden, though they afterwards come out in various forms, according to the character of the patient, his fancy, I believe, being smitten as

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well as his spirits, by the power of this foreign fermentation. This also happens in the case of bites from other mad animals, the result of which is madness, varying according to the nature of the creature that inflicted the sting. There are some who think that the patient sometimes imitates the animal by which it has been stung. This we learn among others from Felix Plater. Unzerus, treating of this subject in his little work on epilepsy, quotes the following two tragic instances from the book of Heinrich on Monstrosities, cap. 15. The one is that of a girl of Wratislaw, the other of a man, whose name is not given. The man having fed on sow's milk is said to have become greatly enamoured of filth. The girl, who in order to cure the epilepsy with which she was attacked, partook of cat's blood, is said to have assumed the character of that animal, imitating the call, leaping, gesture and walk of the creature. Unzerus does not think this story unlikely because it is to their blood and spirit that the temperament and actions of animals owe their birth. Unzerus is altogether at fault in what he brings forward as an explanation of this. Why, forsooth, if the blood of one animal drunk by another can frequently change its character, why do not wolves, after sucking the blood of sheep, take on the nature of the sheep? and why do not weazels, when sucking the blood of chickens, lay

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aside their savage nature? The reason is that the nature of these creatures is, as Andrew Libavius elsewhere argues, too "energetic," and changes the food more violently than it is changed by the food. Although they appear to be invited to some show of gentleness, yet seeing they return to their former native ferocity, this stronger movement overcomes the weaker, and the weaker is transformed by the stronger, not the stronger by the weaker. However that may be, the peculiar virtue inherent in the blood for changing the temperament is beyond controversy. Nor is this the case with blood only, but it is true of milk. Nay, the same may even be said of sweat. The quality and power of milk for changing the temperament of children, and the need of caution in selecting nurses, if the mother herself be unequal or too weak for the task, has been fully and acutely commented upon, among others, by Gellius, in his *Attic Nights*. On the subject of sweat and of its ingredients we have a somewhat full account, with notes of experiments from Lepida, to be found in Scaliger.* He gives the following account in his usual brief way:—"The Aracan King," he says, "thus tries the temperament of his wife. He chooses twelve virgins, all of the same age, and orders them to

* Exerc. 109. De Subtilitate contra Cardanum.

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be completely covered over with woollen cloths. They have then to remain at mid-day diretcly beneath the sun's rays in the highest floor of the house. After they have perspired, which they do profusely under the circumstances, the smell on each set of the garments is tested. Those whose garments smell offensively he gives to his friends for wives, those whose garments smell sweetly he keeps for himself. To prevent deception, the name of the father and mother of the maiden is written on the clothes." So much for that. From this we learn that even in sweat itself there are points worth observing. Nor, again, is it difficult to see that very considerable virtue in changing the character of the blood and spirits resides in the discharged secretion which the Tarantula imparts to the bite at the moment of inflicting the sting. Whether women can also allure men to a love of themselves by means of drugs compounded of their own blood and sweat, I studiously pass by with a brief remark, because I remember I refuted this statement more at length elsewhere. I have stated above that this poison of the Tarantula acts like fermentation. The whole question now comes to this—What is the meaning of this fermentation, which in such small quantity acts more quickly in some and slower in others, but which exercises such great and wonderful power in all?

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§ 3. AN ACCOUNT OF THE DIFFERENCES BETWEEN THIS TARANTULA POISON AND THE ST. VITUS'S DANCE, AS WELL AS OF CERTAIN KINDS OF CONVULSIONS.

The kind of madness, or as it is called the St. Vitus' Dance (clearly from a superstition that, by the help of St. Vitus, the patients were believed to be restored to a better mind, that is to themselves), seems to have some affinity with the sting of the Tarantula. Those affected with this malady are as delirious and restless as those bitten by the Tarantula, and become so engrossed in dancing and running about that they ultimately become quite exhausted and fall on the ground. In connection with this it is worth while referring to the account given by Tulpius, a famous doctor, of a man wretchedly tormented with the disease, but which it is better to read in the Author's own words than in mine. "This species of madness, which is called by Platerus Felix Vitus's Leap, brings on either endless dancing or restless running about. An instance of this kind of malady it was my lot once to witness near Cortacum, a small town of Flanders, in the case of a very wretched man. The poor creature used to run about for days and nights, with such constant leaps and endless agitation, that his whole body was bathed in perspiration. Yet he did not on this account

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cease his movements in the very least, but was so entirely given over to this continual movement, that he never gave himself any peace, unless when exhausted nature demanded her dues of sleep." So far for this case. This account is but little different from another given by the great Felix Plater to the same purpose, with the fame of his name and the skill of his profession, to substantiate his statement.* It is about a woman, who danced on the ground for a whole month at Basle, and to whom the Magistrates furnished certain strong men, one being insufficient to carry on the dance with her. From such statements we see the connection, as well as the distinction, between the sting of the Tarantula and the St. Vitus's Dance. That is, those who are bitten by the Tarantula have a desire to dance inordinately, and do begin to leap as soon as a sound of music or an instrument is heard. The victims of the St. Vitus' Dance, however, quite apart from any sting from the Tarantula, or bite from any mad animal, are seized with that peculiar kind of madness, and, without any sounds of music, do tire themselves out by their movements. But neither do the St. Vitus's Dance nor the effects produced by the sting of the Tarantula show any signs of any kind of convulsion, for a convulsion takes place

* Prax., Bk. i., cap. 3.

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quite apart from the will of the patient, a fact it would be wrong to affirm of either of the other two phenomena. Accordingly, the Arabs are censured by Plater for venturing to deduce the origin of the St. Vitus's Dance from a jerky disposition of the limbs. There are admitted to be certain kinds of convulsions, which seem to imitate very closely the nature both of St. Vitus's Dance, and the results of Tarantula bites, but which really are very distinct, as we learn from a consultation of medical authorities which are easily accessible and familiar. I remember, when I was a boy, that in my native place (Lubeck) I witnessed a most extraordinary case, in a very poor man, who, although perfectly well the day before, began one night to labour under a wretched ailment. The muscles of his whole body, especially of his arms and feet, were so affected that he could not walk without moving wildly alternately an arm, a foot, or both together, thus drawing upon himself the attention of passers-by, who looked on him, some in pity, others in wonder. The account of a woman who was seen in Leyden is somewhat similar. She was so terribly afflicted that when she was compelled to walk, her body moved sometimes on one side, sometimes on another, and with a movement like dancing or leaping. The first sight of her in the temple of the Lutherans made me laugh,

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while it increased her frenzy. I was soon, however, lead to pity her, when I learned the full particulars of her case from my intimate friend, Fürsenius, the present successful Doctor of Medicine at Hamburg. Such cases, however, differ completely and entirely, both from the St. Vitus's Dance and from the effects of Tarantula bites, if, that is, we except the general nature of the symptoms. We see this, when we consider that in the case of Tarantula bites the patient is induced to dance by a maddened imagination, and by his spirits which have been irritated by poisonous elements. In the case of St. Vitus's Dance, however, though the mind be perfectly healthy, yet there is a wonderful agitation of the limbs, corresponding to a kind of leap, the movement being plainly involuntary.

§ 4. An Explanation of the power of Music in curing Tarantula Bites.

The cure of the bite of the Tarantula by music receives illustration from a great number of writers. Although we ought perhaps here to place the sweating and drastic methods of cure, yet these do not detract from the recognised relationship between the poison of the Tarantula and music. Thus, those who have been bitten, as soon as they hear a musical air, begin at once to leap like strong young men, and give them-

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selves up to this exercise for whole months on end. The reason of this desire to dance seems somewhat obscure, as we have already mentioned above. Music rouses the hotter passions and softens men's feelings. Some are charmed or entranced by some sounds, some by others. Hence arose that famous advice of Pythagoras, which the great Bartholinus praises.* Pythagoras, when some young men were conducting themselves in such a riotous way that they seemed madmen, ordered the flute-player, whom they had with them, to play them a solemn tune. The result was they returned at once to a modest comportment, as if they were quite sober. The ancients used various measures to rouse different feelings. The Phrygian measure was employed both for fighting and for mental delectation, the Lydian for sharpening the intellect, the Dorian for exciting feelings of purity, the Æolian for soothing the mind's perturbations. The wonderful affinity between poetry, oratory, and music adds force to what I have said. Their power for influencing the feelings of an audience is known to every one. If the movement of our spirits is too sluggish, (as is the case in sadness) there is nothing strange in the fact that they should be revived by the cheering

* Quæst. Nupt. 3, in Nuptiis Schumacheri.

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and pleasant modulation of music. But if again they are overstrung, they can be restored to order by a proper harmony. Just as love songs are so rendered and sung, that they become sometimes strong, sometimes gentle, now slow and now fast, sometimes giving the effect of an ascent, sometimes of a descent in the scale, according as the Lydian plaint, the Dorian gravity or the Hippodorian revelry prevails, in the same way a corresponding movement in the pulse is found to take place in case of some who are in love, the pulse being found to be sometimes stronger, and sometimes weaker. It is weaker if the person is under fear or sadness, stronger if hope of obtaining his darling come over his mind, and especially on the mentioning of her name. This change in the pulse is so well known that a good doctor can from the mere pulse, and with the necessary precautions, recognise the fire of love lurking in the patient. The story of Erasistratus is well known in the schools of medicine, who, by feeling his pulse, recognised that Antiochus was vehemently devoured by a passion for Stratonice, a concubine of his father's. When she advanced towards him, he noticed the pulse of the young man become variously affected. He informed the father of the symptoms of the malady, and received 100 talents in reward. In the same successful way did Galen learn from the variations of her pulse at the

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mention of her lover, that the wife of Menippus was captivated by Pylas, a performer in the circus. Forestus (*Observ.* 30) tells a tragic story of maddened love, in the case of a buxom young girl of 22, of good constitution, who, when seized by love for a certain youth, became so wretchedly tortured by a feeling of suffocation or hypochondria or so called hysteria, conjoined with epileptic fits, that she was considered a mad woman. Forestus, however, such was his natural sagacity and medical skill, began to suspect that the young woman was labouring under the effects of love, and this he did by observing her pulse. His suspicions were realised, for having been informed of the youth whom she loved, (for he could get no answers to the questions he put to her or to her mistress) he mentioned his name in her presence, and asked the by-standers what he did, and where this John of Leida dwelt. The girl began to laugh and talk, and her pulse underwent at the same time a wonderful change. Having hitherto explained the affinity between music and our spirits, we have now to deal with the connection between music and the Tarantula, as well as with the poison ejected by this creature. I observed in the very beginning of this treatise, that those who are stung by the Tarantula are so severely injured as to become immediately restless and afflicted with various kinds of pains. I said that they

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usually run about, or, like those dead, lie on the ground quite overcome. As soon, however, as they hear a tune, they begin immediately, as if rid of their pain, to leap and dance, not merely in an intelligent way, but so quickly as to out-rival the most robust of youths. As soon, however, as the music stops, they return to the unhappy state produced by the bite, as if they were the victims of some fate. Hence harmony is to them in the place of medicine, for by means of it the spirits, nerves and muscles are made to move. Again when the motion is increased, and the pores all over the body are opened, and the sweat poured out, the unhealty atoms, as they are called, of the disease, are cast out, and the virulence of the malady destroyed, which allows then of the application of antidotes, and sweating mixtures in order to effect a cure. Hence I cannot understand why Cardinus denies that the victims of the Tarantula bite can be cured by music; or, to speak in a more philosophic strain, I am unable to see why he denies that the cure of the malady is due to music. His reason for saying so is, that the nature of music makes it quite unequal to the effecting of such a result. I consider therefore that Cardanus quite deserves the criticism he receives at the hands of Scaliger. "You are right," he says, "in denying that the Tarantula bite can be cured by music, for the

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poison is quenched by the exertions gone through by the patient and the sweat he exudes, which takes the virus along with it, but you ought to have found an explanation of the fact that though overcome by drowsiness after being bitten, the patient is immediately roused up by hearing music. I have seen patients quite languid and weary, who have been roused to such a pitch of heat at the sound of the lute, that the spectators became weary of watching their dancing. During this movement it is that the pain is quieted, the poison being taken from the heart and diffused in every direction, while the mind is relieved from all sense of illness. When the music stops, the patient does not recover immediately, but only by degrees, and when it is repeated the illness disappears. During this whole time the patient is treated with antidotes." These are the remarks of Scaliger. From them we can learn that from this process of cure we cannot altogether banish the power of music. One objection lies in the difficulty why the spirits, nerves, and muscles require the song or musical instruments to rouse them into activity and dancing. A second difficulty is why music can so suddenly cure pains and other symptoms that the patient, seemingly on the brink of the grave, can, as soon as he hears the music, recover strength to dance and leap. A third difficulty is the explanation why our spirits are so

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wretchedly affected by the bite of the Tarantula. There appears to be some kind of close connection traceable between the spirits of the Tarantula (so to speak) and our own spirits. I shall deal with each of these points separately. In the first place we have the objection that when all parts of the body are impregnated with poison, there is no proclivity to leap and dance, but whenever a tune is heard, the air arouses our spirits and plays pranks on them. Our nerves and muscles are roused to movement and even to dancing and leaping. The more the movement continues, the greater and more profuse is the expenditure of sweat, and the freer do our spirits become, while the particles of poison make their way from the interior to the exterior surface of our bodies. The fact that on the removal of the music the patient returns gradually to his bad symptoms is due to the fermentation in the poison which increases and developes in its passage through the body. This statement is seen to be true both in the case of those who are intoxicated, and of those who are suffering from a burning fever. Those who are suffering from fever, by a wonderfully deranged fancy, and under the influence of the burning force within them, leave their beds and are worked into a state of high bodily excitement, although before neither hand nor foot could fulfil their proper function, and the patients themselves seemed little

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distant from the threshold of the grave. Again those who are the victims of intoxication show the strength of their body although the day before they may appear exhausted with fiery breathings which rack their whole being, and seem as if scourged with lashes. This mobility and excessive fervour is frequently the cause why even grave men, when they have drunk too much, by the fiery inhalations which have suddenly been carried to their brain, are compelled to dance and act like clowns, flinging their arms and legs about in all directions, and conducting themselves in a way for which they are heartily sorry on the morrow. The case is similar with those who have been bitten by the Tarantula, who evince such a sudden recovery of strength, that it appears due to some supernatural agency. The reason also is clear why the victims of the Tarantula are so grievously affected by its poison. As to how the sounds which are merely brought to our ears can have such a powerful influence in moving our spirits and our minds, it is a doubtful point.

§ 5. Can Music cure other Diseases besides the Sting of the Tarantula?

Alexander,* among other writers, maintains that music is a cure for other ills besides the Tarantula's sting. He tell us that Theophrastus,

* Dier. Genial., bk. ii., cap. 7.

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the philosopher, a man of wonderful wisdom, the successor of Aristotle in the Academy, who was well known and esteemed in physical and mathematical science, states, that the strains of pipes or lyres and other wind instruments played in a proper manner can cure the bites of vipers. Esclepiades also, the ancient doctor, states the same fact. His opinion was that those who were troubled with frenzy or mental affections could best be restored and cured by harmony and songs. We are told also that Ismenias the Theban cured several Bæotians, who were labouring under hip-joint disease, by playing on the lute. So great do we perceive is the connection between the nature of man and a harmony of sound. The fact that some hip-joint patients were restored to health by some Phrygian strains (as they are called) can be seen from the words of Theophrastus Eresius, which I quote—"One could make them perfectly whole and free from their trouble by singing to them in the Phrygian strain." There are those who affirm that a sound or tune has different effects on different persons, maintaining that it has provoked some to the pouring out of their own blood, while in other cases it has inspired, as it were, new blood and life. The latter fact we learn from Pliny, the former from Scaliger. Scaliger mentions in his treatise on subtilty, written against Cardanus, that it was a sound

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which roused the effeminate monsters of Cybele to pour out their own blood, while Pliny, as if in praise of Homer, his authority, reminds us that it was by a song that Ulysses or the sons of Autolicus (whom Delecampus mentions in his notes to Pliny as having been meant by Homer) stopped the flow of blood. Whether these statements are overdrawn or savour somewhat of the magical, I pass over without comment, though I may perhaps some day discuss the question. At present, however, my remarks must be general and brief. If music provides a spell, as it were, against the aforesaid troubles, I think it does so by no other means than by the soothing effect of its notes, whereby the movements of the mind are variously stirred. Hence we see, if the story is true, why those so-called effeminate monsters were induced by hearing a sound to pour out their own blood. For whether urged by heat or fury, they cut into their veins, nerves, muscles, or other parts of their body. This, however, opens to us a wide and unexplored field of investigation. With my small powers, and especially with the small space at my disposal, I dare not venture further than I have done. Later, when my studies are more complete, I may venture to return to this subject. Meanwhile, kind reader, fare thee well.

Praise be to God Everlasting!

END OF VOL. III.

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